Main Plaza Redevelopment

Traffic Impact Analysis of Proposed Closure of Main and Main Plaza/Soledad Streets

Report Prepared for
Bender Wells Clark and City of San Antonio

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Traffic Impact Analysis
of Proposed Closure of Main and Main Plaza/Main Plaza/Soledad Streets
Executive Summary

Background

After reviewing several alternatives to expand Main Plaza by closing one or more streets adjacent to the Plaza, the City of San Antonio is now focusing its attention on one preferred alternative for the renovation, expansion, and upgrading of Main Plaza. A plan prepared by Larry Clark of Bender Wells Clark Design portrays that alternative.

The Plan is to close Main from Commerce to Dolorosa-Market and Main Plaza/Soledad from Dolorosa-Market to Commerce. These streets now function as a one-way pair carrying north-south vehicular and bus traffic past the Plaza. The closure of Main will result in the southbound Main street traffic being rerouted to Flores Street via Commerce. The closure of Main Plaza/Soledad will reroute northbound traffic to either Navarro or to Flores with adequate advanced warning and directional signage.

This report provides an analysis of the impact of the street closures on vehicular, pedestrian, and bus traffic. It also sets forth some recommendations to mitigate the impacts.

Summary of Traffic Improvements and Impacts

As it relates to traffic flow and traffic impact, there are several features about the proposed plan that are significant. They are:

- ✓ Commerce Street from Main Plaza/Soledad to Main and Dolorosa-Market remain open with all four lanes in use.
- ✓ Main and Main Plaza/Soledad from Commerce to Dolorosa-Market are closed to traffic. However, the existing capacity of the downtown street system can absorb the Main and Main Plaza/Soledad traffic that is rerouted.
- ✓ VIA bus traffic remains on Commerce and on Dolorosa-Market and operates without interruption in the assigned bus lanes on these two streets.
- ✓ VIA bus service on Main (4 routes) and Dwyer (3 routes) would continue but must be rerouted to Flores because of the closure of Main and Main Plaza/Soledad. Impacts due to the bus route changes must be coordinated with VIA and the issues will be addressed in a separate report.
- ✓ Pedestrians are able to easily cross Commerce and Dolorosa-Market at the four intersections surrounding the Plaza and in mid block locations between Main and Main Plaza/Soledad as well.

- ✓ Access to existing parking facilities in the area such as the Frost Bank Garage is preserved.

- ✓ Access to businesses, hotels, governmental offices, and parking facilities on Market east of Main Plaza are maintained without interruption.

Traffic Impact Analysis

This report presents traffic data related to the operation of the streets around Main Plaza and the impact that closures on Main and on Main Plaza/Soledad will have on the vehicular traffic, bus traffic, and pedestrian movement in the area. Data is provided in tabular form about traffic volumes both hourly and daily, travel times, buses, and pedestrians. This data was derived from City of San Antonio files and records and from reports or other studies conducted in the area in the past several years. When data was not available field studies were made to collect that data.

The data was incorporated first into a CORSIM model and then uploaded into a VISSIM model. Four alternatives were analyzed. They were:

A. Closure of all four streets around the Plaza
B. Closure of the two North-south streets—Main and Main Plaza/Soledad
C. Closure of three streets but leave Commerce open, and
D. Closure of three streets but leave Dolorosa-Market open.

The Alternative with the least impact was the closure of Main and Main Plaza/Soledad Streets.

Overall network delays are anticipated to be very minor in nature. The average delay per vehicle in the PM would only increase on average 10 seconds and in the AM peak hour the average delay per vehicle will increase approximately 15 seconds. The greatest impact will probably be on vehicles which will need to re-route around the Main or the Main Plaza/Soledad street closures. For the southbound Main traffic this increase in travel time was collected in the field and is estimated to be 1 minute and 34 seconds during the AM peak and 1 minute and 57 seconds during the PM peak.

Summary

In summary, the proposed closures of Main and Main Plaza/Soledad cause some impacts on traffic flow in the vicinity of Main Plaza. However, those changes for vehicular and bus traffic have the least impact of the four alternatives analyzed during the traffic study. The vehicular traffic can be rerouted to Flores with minimal impacts. There is capacity on Flores to accept this increased traffic loading.

Main and Main Plaza/Soledad currently have the least number of VIA bus routes (7) and those routes can be moved to Flores or to Navarro with only minimal impacts. Pedestrian travel and access to the Plaza is greatly enhanced by the proposed expansion of the Plaza that is allowed by the closure of Main and Main Plaza/Soledad.

Since Commerce Street and Dolorosa-Market Streets remain open in the proposed Plan for Main Plaza, there will be no impact on east-west traffic or those buses and bus riders that travel on those streets.

Traffic Impact Analysis
of Proposed Closure of Main and Main Plaza/Soledad Streets

Background

After reviewing several alternatives to expand Main Plaza by closing one or more streets adjacent to the Plaza, the City of San Antonio is now focusing its attention on one preferred alternative for the renovation, expansion, and upgrading of Main Plaza. A plan prepared by Larry Clark of Bender Wells Clark portrays that alternative. The preferred alternative is shown as Exhibit 1 below.

The Plan is to close Main from Commerce to Dolorosa-Market and Main Plaza/Soledad from Dolorosa-Market to Commerce. These streets now function as a one-way pair carrying north-south vehicular and bus traffic past the Plaza. The closure of Main will result in the southbound Main street traffic being rerouted to Flores street via Commerce. The closure of Main Plaza/Soledad will reroute northbound traffic to either Navarro or to Flores with adequate advanced warning and directional signage.

This report provides an analysis of the impact of the street closures on vehicular, pedestrian, and bus traffic. It also sets forth some recommendations to mitigate the impacts.

Summary of Traffic Improvements and Impacts

As it relates to traffic flow and traffic impact, there are several features about the proposed plan that are significant. They are:

- ✓ Commerce Street from Main Plaza/Soledad to Main remains open with all four lanes in use.
- ✓ Dolorosa-Market from Main to Main Plaza/Soledad remains open with all four lanes in use.
- ✓ Main and Main Plaza/Soledad from Commerce to Dolorosa-Market are closed to traffic. However, the existing capacity of the downtown street system can absorb the Main and Main Plaza/Soledad traffic that is rerouted.
- ✓ Traffic signals will remain in place at each of the four intersections on the corners of the Plaza.
- ✓ As a result, pedestrians are able to easily cross Commerce and Dolorosa-Market at the four intersections surrounding the Plaza and in mid block locations between Main and Main Plaza/Soledad as well. At the intersections the signal timing and phasing will be set up to allow pedestrians to cross the intersection at a diagonal.
- ✓ VIA bus traffic remains on Commerce and on Dolorosa-Market and operates without interruption in the assigned bus lanes on these two streets.
- ✓ VIA bus service on Main (4 routes) and Dwyer (3 routes) would continue but must be rerouted to Flores because of the closure of Main and Main Plaza/Soledad. Impacts due to

the bus route changes must be coordinated with VIA and the issues will be addressed in a separate report.

- ✓ The Streetcar System would not have a significant change in downtown routing.
- ✓ Some adjustments in the bus stop locations on Commerce, Market, and Flores will also improve service into and out of the Main Plaza area, and will facilitate transfers from N-S routes to E-W routes and vice versa.
- ✓ Access to existing parking facilities in the area such as the Frost Bank Garage is preserved.
- ✓ Access to shops, businesses and governmental offices on Commerce west of Main Plaza continues without interruption.
- ✓ Access to businesses, hotels, governmental offices, and parking facilities on Market east of Main Plaza are maintained without interruption.
- ✓ Dwyer approaching Dolorosa-Market will be modified to accommodate right turn only traffic and the street narrowed to provide for two lanes of traffic and a wider sidewalk next to the Morris Apartments Building thereby allowing for sidewalk cafes.
- ✓ Main Street approaching Commerce will be modified to accommodate right turn only traffic and that would allow the street to be narrowed to two lanes and the sidewalk widened on one side of Main.
- ✓ Detour routes will be established and properly signed for the Main and Main Plaza/Soledad street closures.
- ✓ Existing parking spaces on Main and on Main Plaza/Soledad next to the Plaza will be relocated to the west side of Main Street south of Dolorosa-Market.
- ✓ By keeping Commerce open and closing Main Plaza/Soledad at Main Plaza, new developments on Main Plaza/Soledad north of Commerce can be accommodated and parking added or sidewalks can be widened.

Exhibit 1 -- Preferred Alternative for Main Plaza

Prepared by Bender Wells Clark Design for City of San Antonio

Specific Review of the Closures of Main and of Main Plaza/Soledad

Closure of Main Ave.

Complete closure of Main on the west side of the Plaza can be accommodated by routing all Main Street southbound traffic westerly along Commerce to Flores, then south on Flores to Dolorosa or Nueva, and then back to Main Street. Rerouted traffic would not be encouraged to use Main Ave between Dolorosa and Nueva but instead would be routed south on Flores to Nueva. This action would allow Bexar County to treat Main Street adjacent to the County Courthouse as a local street with parking on one or both sides and striped crosswalks to connect the two County buildings. Although some delay is imposed by this detour routing, it is minimal and the transition to Flores can also occur at several streets in advance of Commerce, such at Martin Street, Travis Street, and Houston Streets.

There will be some impact to the exiting traffic from the Frost Bank Garage. The garage has two exits--one on Flores and the other onto Main. The Flores exit requires exiting traffic to turn right and travel north on Flores. Traffic exiting the Garage on Main must turn south on Main to Commerce. The closure of Main at Main Plaza requires that traffic follow the detour cited above if the motorist wishes to travel east on Market Street or south on South Main. However, even this impact should be minimal. There is a significant amount of street network capacity in the downtown area to accommodate the Main and Main Plaza/Soledad closures.

The closure of Main Ave allows for the redevelopment of Main as part of the Main Plaza. That redevelopment will dictate whether Main Ave could be open on some occasions and closed on others.

Closure of Main Plaza/Soledad Street

Complete closure of Main Plaza/Soledad on the east side of the Plaza can be accommodated by routing northbound traffic on Dwyer to Flores Street or to Navarro Street and eastbound left turning traffic on Dolorosa-Market to Flores, depending upon the ultimate destination. Northbound bus routes on Dwyer would be diverted to Flores Street, and then turned east on Houston or Travis to Main Plaza/Soledad.

Bus transfer points now occurring at Commerce and Main Plaza/Soledad would be relocated to the intersection of Commerce and Flores. Bus transfers now occurring at Main and Dolorosa will move one block west to Dolorosa and Flores.

Rerouting of Main Ave and Main Plaza/Soledad Traffic to Flores

The rerouting of Main Ave and Main Plaza/Soledad traffic onto Flores will have some impact during AM and PM peak traffic hours. However, there is sufficient capacity to handle the traffic in the off-peak hours. The section of Flores north of Commerce is narrow, but is striped for four lanes of traffic. Flores at Dolorosa is wider and striped for four lanes of traffic and a southbound to eastbound left turn lane. With some signal phasing and timing changes, this intersection will operate at a good level of service except during the AM and PM peak hours which will operate at level of service “C”. A level of service “C” is still acceptable but it will be more congested than the

current level of service the intersection is experiencing. Some congestion may occur during these two hours, which are normally 7 am to 8 am and 5 pm to 6 pm on weekdays.

Development of Alternative Scenario Model

WHM, a subconsultant to PBS&J, modeled four alternative scenarios as requested by the City of San Antonio. Alternative scenarios include various closures of all four perimeter streets around Main Plaza, also known as the Plaza De Las Islas. The Alternatives included the following:

E. Closure of all four streets
F. Closure of the two North-south streets—Main and Main Plaza/Soledad
G. Closure of three streets but leave Commerce open, and
H. Closure of three streets but leave Dolorosa-Market open.

These scenarios were modeled with a software package known as VISSIM, which is a shortened version of Visual Simulation. The modeling software utilizes all available traffic data, pedestrian data, and bus traffic data. It also distributes that traffic data over the street links or area under study in the timeframes that it is occurring. After producing a two-dimensional image of the traffic patterns in place, the model incorporates topographical and vertical elevation data to present a 3-D image of the traffic flowing in and through the area of study. A film clip is produced with the data that can be shown and/or reviewed to simulate the current real conditions or to demonstrate the impact of changes in traffic patterns on the existing street network.

For the Main Plaza Traffic Modeling Study estimates of measures of effectiveness (MOEs) were derived and used to compare the impacts of the four alternatives. Comparative analysis provided a way to look at the relative impact of the four alternatives and to choose a course of action that would minimize any impacts to traffic flow and traffic operations. Based on public input regarding the alternative Plaza Improvement Plans, the alternatives were narrowed to the preferred alternative, the north-south street (Main Street and Main Plaza/Soledad Street) closure adjacent to the Plaza. The north-south closure is analyzed in this section.

As part of the preferred alternative, Main Street and Main Plaza/Soledad Street will be closed between Commerce and Market Streets. The north-south closure models were developed to primarily evaluate the impact of these road closures adjacent to the Plaza on the downtown street network . The Architect's plan for Main Plaza is illustrated in **Exhibit 1**.

To model these scenarios in VISSIM, the existing conditions network served as the base. Geometric changes were coded as necessary to reflect improvements such as signal timing optimization, modification of lane use assignment, addition of lanes, etc. Traffic volumes were redistributed to account for network changes associated with the north-south street closures. Synchro, a signal optimization software (Ref. 2), was used along with minor manual adjustments to develop optimized signal timing plans for the alternative scenarios.

The analysis of existing conditions forms the basis for VISSIM traffic simulation development and for evaluation of future conditions. The major elements of the existing conditions scenario are year 2000 vehicular volumes with supplemental 2006 vehicular volumes collected as part of the updated study, as well as geometrics of the existing roadway network. In addition to data provided by the

City of San Antonio, field studies were conducted to collect supplemental data needed for the evaluation of traffic operations.

Existing Thoroughfare System

The project's area network includes Main Street, Main Plaza/Soledad Street, Commerce Street and Market Streets in downtown San Antonio. The interrelationship of these roadways and others in the area is shown in **Figure 1-1**. To adequately describe the significance of these roadways, a further characterization is provided for each.

- Market Street – Currently, Market Street is a four-lane roadway including an exclusive bus lane and operates as a one-way pair with Commerce Street inside the study area. This roadway will play a major role in the interchange of traffic between the Plaza De Las Islas and the surrounding network. The Commerce Street/Market Street one-way pair system provides direct access to IH 35 and IH 37, two major freeway systems through downtown San Antonio.

- Commerce Street – Currently, Commerce Street is a four-lane roadway including an exclusive bus lane and operates as a one-way pair with Market Street inside the study area. This roadway will play a major role in the interchange of traffic between the new development and the surrounding network.

- Main Street – Currently, Main Street is a three-lane roadway and operates as a one-way pair with Main Plaza/Soledad Street inside the study area. Main Street forms the western boundary and provides direct access to the Plaza. Some parking spaces will be lost as a result of this closure.

- Main Plaza/Soledad Street – Currently, Main Plaza/Soledad Street is a three-lane roadway and operates as a one-way pair with Main Street inside the study area. Main Plaza/Soledad Street forms the eastern boundary and provides direct access to the Plaza. Some parking spaces and loading spaces will be lost as a result of this closure.

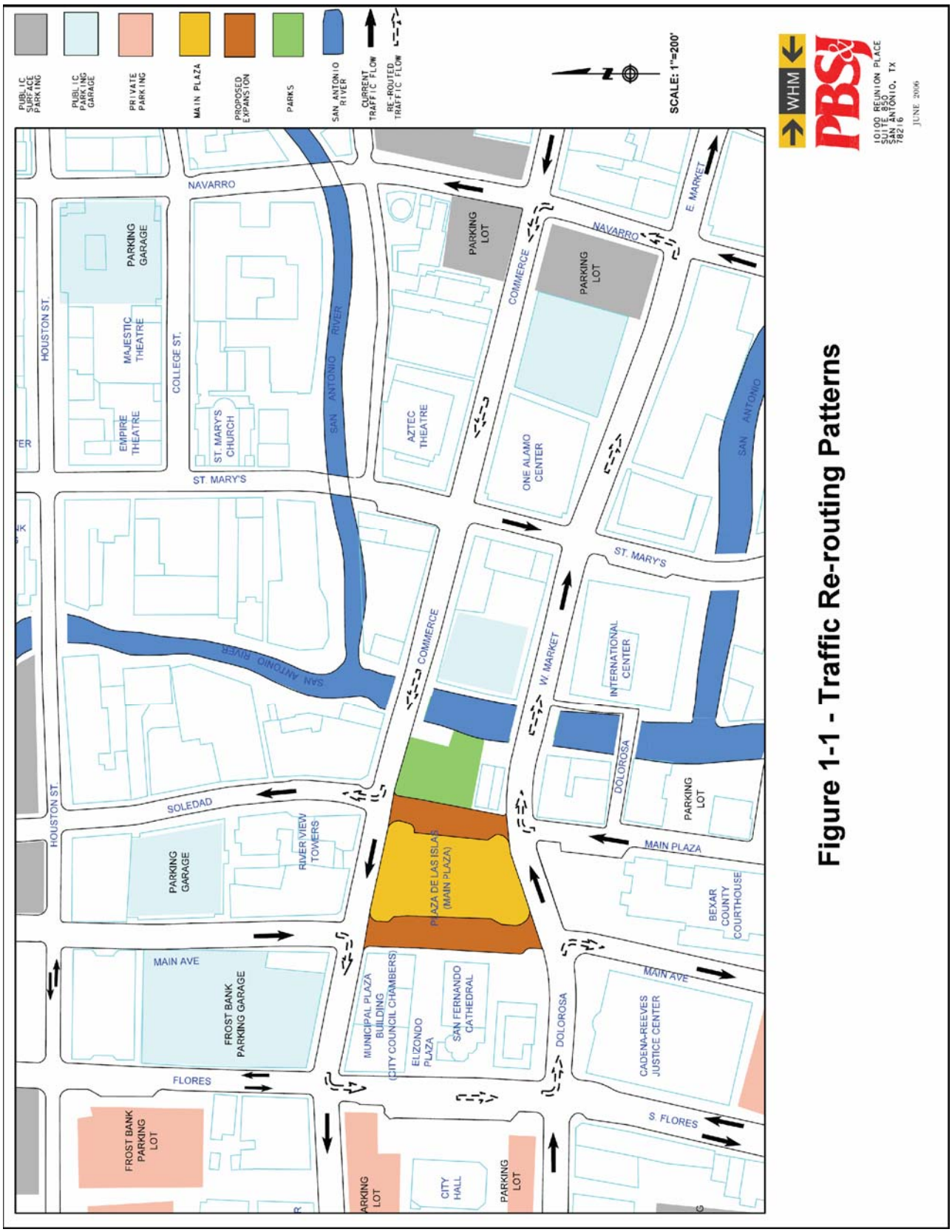

Figure 1-1 - Traffic Re-routing Patterns

- St. Mary's Street – Currently, St. Mary's Street is a three-lane roadway including an exclusive bus lane and operates as a one-way pair with Navarro Street inside the study area. The St. Mary's Street/Navarro Street one-way pair system is heavily utilized by the transit system through downtown San Antonio.

- Navarro Street – Currently, Navarro Street is a three-lane roadway including an exclusive bus lane and operates as a one-way pair with St. Mary's Street inside the study area.

- Flores Street – This roadway forms the western boundary of the study area and is a four-lane roadway.

- East Houston Street – Currently, East Houston Street is a two-lane roadway in the study network. Houston Street was recently reconstructed to a reduced cross-section.

- Nueva Street – This roadway forms the southern boundary of the study area and is a four-lane roadway.

- Travis Street – This roadway forms the northern boundary of the study area and is a four-lane roadway.

Existing Traffic Volumes

Existing AM and PM peak hour traffic volumes along the primary roadways in the study area are summarized in **Table 1**. Traffic estimates were developed at area intersections where no recent count information was available based on a historical growth rate of 1 and 2 percent during the AM and PM peak periods, respectively. Traffic counts conducted recently were used to verify the assumptions of the traffic models. The most heavily traveled roadways in the study area are Market Street and Commerce Street. Commerce Street carries approximately 1,119 vehicles per hour (vph) during the PM peak period west of Main Plaza/Soledad Street, and Market Street carries approximately 898 vph during the PM peak period east of Main Avenue. Overall, more traffic travels through the study area network in the AM peak period than in the PM peak period.

TABLE 1
2006 EXISTING PEAK HOUR TRAFFIC VOLUMES

ROADWAY	LOCATION	DIRECTION	VOLUME, VPH		VOLUME, VPD
			AM PEAK	PM PEAK	DAILY[1]
COMMERCE	**WEST OF SOLEDAD**	**WB**	**867**	**1,119**	**16,800**
MARKET	**EAST OF MAIN**	**EB**	**799**	**898**	**13,800**
MAIN	**S. OF COMMERCE**	**SB**	**600**	**769**	**4,500**
SOLEDAD	**NORTH OF MARKET**	**NB**	**506**	**969**	**5,400**
FLORES	**NORTH OF MARKET**	**NB**	**447***	**419***	**6,300**
FLORES	**NORTH OF MARKET**	**SB**	**358***	**384***	**5,800**

1) Estimated Average Daily traffic volumes
*2006 Estimates based on Historic Traffic Patterns

The most heavily traveled roadways in the study area are Market Street and Commerce Street. Commerce Street carries approximately 1,119 vehicles per hour (vph) during the PM peak period west of Main Plaza/Soledad Street, and Market Street carries approximately 898 vph during the PM peak period east of Main Street. The daily volumes are 16,800 vehicles on Commerce and 13,800 vehicles on Dolorosa-Market. Overall, more vehicles travel through the study area network in the PM peak period than in the AM peak period.

The two streets being closed—Main and Main Plaza/Soledad—carry 769 and 969 vehicles per hour during the PM peak, and 4,500 vehicles per day and 5,400 vehicles per day, respectively. Although the PM peak hour on Main Plaza/Soledad carries a high volume of vehicles, the traffic volume over the remainder of the day is almost a third less than the daily volumes on Commerce and on Market.

Main Plaza/Soledad carries less traffic than two of the other boundary streets, and therefore the impact of the Main Plaza/Soledad closure at Main Plaza appears to be minimal. The proposed development plans for the Main Plaza/Soledad alignment would not allow for temporary closures.

Existing Travel Times

Travel time runs were performed by GKW Engineering, a subconsultant to PBS&J, on May 30, 2006 for the PM peak hour of 5 pm to 6 pm and on May 31, 2006 for the AM peak hour of 7 am to 8 am. Travel time runs are trips actually made in a vehicle over the routes being studied to compare existing conditions with proposed conditions. The time to traverse the route(s) are recorded for both existing and proposed scenarios.

The AM and PM travel times were very similar for both peak hour periods. Average travel times are presented in **Table 2** below.

TABLE 2

2006 EXISTING PEAK HOUR TRAVEL TIMES

ROUTE NUMBER	ROUTE DESCRIPTION	TRAVEL TIME (SEC)	
		AM PEAK	PM PEAK
1	**EXISTING CONDITIONS--MAIN FROM HOUSTON TO DOLOROSA**	**39**	**36**
2	**PROPOSED CONDITIONS--MAIN AVE FROM HOUSTON; TURN RIGHT AT COMMERCE; TURN LEFT AT FLORES; TURN LEFT AT DOLOROSA; CONTINUE TO MAIN AVE AT DOLOROSA**	**133**	**153**

As shown in **Table 2**, the existing travel time for traveling from southbound Main to making a left turn on Dolorosa unimpeded is approximately 39 seconds. If Main Street were closed and a detour route using Commerce, turning left on Flores and then another left on Dolorosa to arrive at Main and Dolorosa would result in an increase travel time of 1 minute and 34 seconds for the morning peak hour. During the afternoon peak hour, the increase travel time would be 1 minute and 57 seconds. Both cases result in an increase of less than two minute to go around the block using the existing traffic signal system timings. Refer to **Figure 2**.

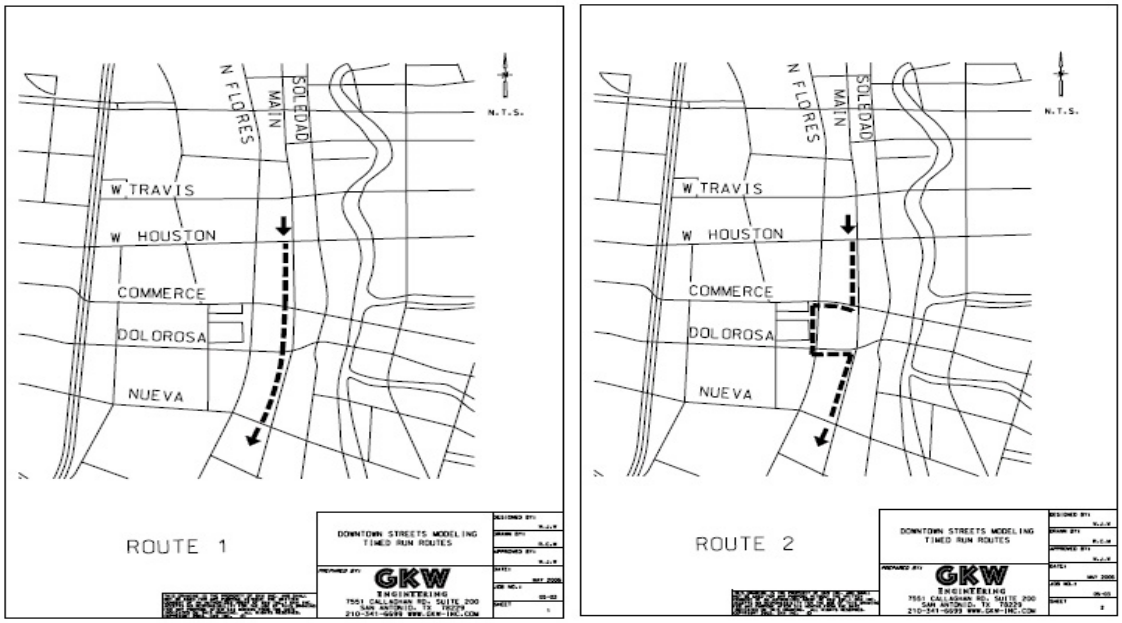

Figure 2

Route 1 **Route 2**

Existing Pedestrian Volumes

Existing AM and PM peak hour pedestrian volumes along Main Plaza are identified in **Table 3**. The intersection of Commerce Street and Main Plaza/Soledad Street carries the highest pedestrian volumes at approximately 835 pedestrians during the PM peak hour. Overall, more pedestrians travel through the Main Plaza intersections in the PM peak period than in the AM peak period.

TABLE 3

2006 EXISTING PEAK HOUR PEDESTRIAN VOLUMES

INTERSECTION	PEDESTRIANS PER HOUR	
	AM PEAK	PM PEAK
COMMERCE STREET AND MAIN STREET	**294**	**302**
COMMERCE STREET AND MAIN PLAZA/SOLEDAD STREET	**517**	**835**
MARKET STREET AND MAIN STREET	**390**	**355**
MARKET STREET AND SOLEDAD STREET	**352**	**327**

Existing Transit System

VIA Metropolitan Transit Authority provides transit service in downtown San Antonio with a variety of different bus routes. The Streetcar service is a fixed route downtown circulator service that serves the core of San Antonio's downtown and radiates to areas outside of the study area. Most of the streetcar routes operate in parts of the study network while servicing other parts of the downtown.

Other regularly scheduled services include local, limited and express/flyer routes. Many of the routes operate in a paired or "hooked" manner. An example of a hooked route would be a route that enters downtown from the west as one route, travels through downtown and exits the area as another route. Heavily traveled transit streets through the study area include Commerce Street, Market Street, St. Mary's Street and Navarro Street. Existing bus route information provided by VIA for the streets surrounding the perimeter of Main Plaza is summarized in **Table 4**.

TABLE 4

2006 WEEKDAY BUS ROUTES AND VOLUMES

ROADWAY	DIRECTION	NO.OF ROUTES	VOLUME, VPD
COMMERCE STREET	**WB**	**12**	**428**
MARKET STREET	**EB**	**13**	**432**
MAIN STREET	**SB**	**4**	**120**
MAIN PLAZA/SOLEDAD STREET	**NB**	**3**	**126**

VPD = Vehicles (Buses) per day

The existing condition models served as the base for development of the North-South Closure models. Traffic volumes used in the existing AM and PM peak hour networks were redistributed to other streets in the study area based on a method agreed upon with the City of San Antonio staff to account for network modifications.

No improvements were assumed for the existing analysis scenario, since the purpose of this analysis run was to identify the impact of the street closures on existing traffic operations. The analysis process included operational modeling of intersections and arterials within the study area, as well as the assessment of impacts on vehicular and transit operation.

Traffic Operations

Network-wide statistics are critical to the evaluation of the overall efficiency of the transportation system. Results for volume, travel time, delay, average speed, and overall intersection level-of-service are summarized in **Table 5.**

TABLE 5

NETWORK-WIDE AVERAGE STATISTICS

Scenario	**Total Travel Time**		**Vehicle Delay Time**		**Travel Time Per Veh.**		**Delay Time Per Veh.**	
	veh-hours		**veh-hours**		**min./veh.**		**sec./veh.**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Weekday								
Existing	207.3	186.1	106.4	91.0	2.0	1.9	62	57
North-South Closure	244.1	225.9	134.8	120.3	2.3	2.1	77	67

Existing Model - Existing conditions measures of effectiveness (MOEs) reflect that the study network operates very well. The VISSIM model indicates the worst level of service will occur at the intersection of Flores Street and Market Street and is anticipated to be at a level of service “C”. A level of service “C” is a good level of service which indicates that currently

there is sufficient capacity available at the existing intersection to accommodate the increase in traffic volume anticipated with the re-routing of traffic.

North-South Closure Models - Based on the evaluation of the MOE's for the alternative scenarios, the North-South Closure scenario (preferred alternative) has the least impact on traffic operations. A network-wide comparison of the MOEs shows that delay increases by approximately 15 seconds per vehicle and the average travel time is increased by approximately 18 seconds per vehicle during the weekday AM peak period. During the PM peak period, the delay increases by approximately 10 seconds per vehicle and the average travel time increases by approximately 12 seconds per vehicle. The impact of the north-south street closure is minimal and can be mitigated by improvements within the existing curbs. No additional road construction or right-of-way acquisition would be required. Impacts to VIA routes will also be minimal under the preferred alterative since the majority of the VIA routes travel along Commerce Street and Market Street.

Recommendations

The preferred alternative Plan for the redevelopment of Main Plaza closes Main Street and Main Plaza/Soledad Street between Dolorosa-Market and Commerce. By closing the two streets--Main and Main Plaza/Soledad--the traffic volumes of 600 and 506 vehicles per hour in the peak hour, respectively, must be rerouted to other streets. In addition, 120 buses per day on Main and 126 buses per day on Main Plaza/Soledad would be redirected to Flores or Navarro. Currently there are at total of seven (7) existing bus routes that will need to be re-routed.

Although there will be some impact associated with these closures, those impacts will be the least of all options studied except the Do-Nothing alternative. The surrounding street network has the capacity to absorb the increased traffic loading caused by the closures with minimal impact to operations. That rerouted traffic will primarily be using Flores and Navarro although some increased traffic flow may be evident on other north-south streets (or one-way pairs) downtown such as Santa Rosa, Presa-Losoya, and Alamo. Some signal timing changes and traffic operational changes will be necessary on Flores at Dolorosa and at Nueva to mitigate the impacts of increased left turning traffic caused by southbound motorists finding their way back to Main south of Dolorosa.

Overall network delays are anticipated to be very minor in nature. The average delay per vehicle in the PM would only increase on average 10 seconds and in the AM peak hour the average delay per vehicle will increase approximately 15 seconds. The greatest impact will probably be on vehicles which will need to re-route around the Main or the Main Plaza/Soledad street closures. For the southbound Main traffic this increase in travel time was collected in the field and is estimate to be 1 minute and 34 seconds during the AM peak and 1 minute and 57 seconds during the PM peak.

The VISSIM model indicates the worst level of service will occur at the intersection of Flores Street and Market Street and is anticipated to be at a level of service "C". A level of service "C" is a good level of service which indicates that currently there is sufficient

capacity available at the existing intersection to accommodate the increase in traffic volume anticipated with the re-routing of traffic.

From a traffic analysis point of view, this preferred alternative of North-South Closure is recommended for its minimum impact on traffic flow within the project area.

Summary

In summary, the proposed closures of Main and Main Plaza/Soledad cause some impacts on traffic flow in the vicinity of Main Plaza. However, those changes for vehicular and bus traffic have the least impact of the four alternatives analyzed during the traffic study. The vehicular traffic can be rerouted to Flores with minimal impacts. There is capacity on Flores to accept this increased traffic loading.

Main Plaza/Soledad carries less traffic than two of the other boundary streets, and therefore the impact of the Main Plaza/Soledad closure at Main Plaza appears to be minimal. The proposed development plans for the Main Plaza/Soledad alignment would not allow for temporary closures.

Main and Main Plaza/Soledad currently have the least number of VIA bus routes (7) and those routes can be moved to Flores or to Navarro with only minimal impacts. Those impacts are primarily in the location of bus stops that allow for easy transfer from north-south bus routes to east-west bus routes. In addition, the Plan with its proposed closing of Main and Main Plaza/Soledad streets will not cause any impacts to the current streetcar routes, and that is another benefit of this alternative.

Pedestrian travel and access to the Plaza is greatly enhanced by the proposed expansion of the Plaza that is allowed by the closure of Main and Main Plaza/Soledad.

Since Commerce Street and Dolorosa-Market Streets remain open in the proposed Plan for Main Plaza, there will be no impact on east-west traffic or those buses and bus riders that travel on those streets.